



A Survey Paper on CDA Generation and Integration for Health Information Exchange Based on Cloud Computing System

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ABSTRACT:The patient's details about its safety and quality care are laugh as successfully is necessary for the clinic, but it has the need of interoperability between Health Information Exchange at different hospitals. The Clinical Document Architecture (CDA) developed by HL7 is a core document standard to assurer such interoperability, and extension of this document format is critical for interoperability. Badly, hospitals are not interested to adopt interoperable HIS because of its deployment cost except for in a handful countries. A problem arises even when more hospitals start using the CDA document format because the data spread in different documents are hard to manage. In this paper, we describe our CDA document generation and integration Open API service based on cloud computing, through which hospitals are allow to conveniently generate CDA documents without having to purchase proprietary software. Our CDA document integration system integrates multiple CDA documents per patient into a single CDA document and doctor and patients can browse the clinical data in chronological order. Our system of CDA document generation and integration is based on cloud computing and the service is offered in Open API. Developers using different platforms thus can use our system to increase interoperability.

KEYWORDS: Health information exchange, HL7, CDA, cloud computing, software as a service, Open API.

I. INTRODUCTION

One of the key features of the cloud includes the flexibility, so we used the clouds for large data storage system. When a patient is recognize at a clinic, a CDA document recording the diagnosis is generated. The CDA document can be shared with other clinics if the patient agrees. The concept of family doctor does not exist in some countries; therefore it is common for a patient to visit a number of different clinics. The interchange of CDA document is triggered in the following cases: when a physician needs to study a patient's medical history; when referral and response letters are drafted for a patient cared by multiple clinics; when a patient is in urgent situation and the medical history needs to be reviewed. It takes get larger amount of time for the medical personnel as the amount of exchanged CDA document increases because more documents means that data are distributed in different documents. This significantly holdsup the medical personnel in making decisions. Hence, when all of the CDA documents are integrated into a single document, the medical personnel is empowered to review the patient's clinical history conveniently in chronological order per clinical section and the follow-up care service can be delivered more effectively. Unfortunately for now, a solution that integrates multiple CDA documents into one does not exist yet to the best of our knowledge and there is a practical limitation for individual hospitals to develop and implement a CDA document integration technology.

II. LITERATURE SURVEY

K. Ashish, [1] presented meaningful use of electronic health records the road ahead. For practicing clinicians, the origins and likely effects of this rule may be opaque. It would be helpful to understand the motivation behind the key



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components of the meaningful use rules, where they are likely to take the US health care system (and the obstacles along the way), and the benefits and risks of a rapid transformation from paper to electronic record systems.

J. D. D'Amore, D. F. Sittig, A. Wright, M. S. Iyengar, and R. B. Ness,[3] proposed the promise of the CCD: challenges and opportunity for quality improvement and population health. Interoperability is a requirement of recent electronic health record (EHR) adoption incentive programs in the United States. One approved structure for clinical data exchange is the continuity of care document (CCD). While primarily designed to promote communication between providers during care transitions, coded data in the CCD can be re-used to aggregate data from different EHRs. This provides an opportunity for provider networks to measure quality and improve population health from a consolidated database. To evaluate such potential, this research collected CCDs from 14 organizations and developed a computer program to parse and aggregate them.

M. Armbrust, A. Fox, R. Griffith, A. D. Joseph, R. Katz, A. Konwinski, G. Lee, D. Patterson, A. Rabkin, I. Stoica, and M. Zaharia,[6] presented a view of cloud computing which describes cloud computing. Authors goal in this article is to reduce that confusion by clarifying terms, providing simple figures to quantify comparisons between of cloud and conventional computing, and identifying the top technical and non-technical obstacles and opportunities of cloud computing.

S. Lee, J. Song, and I. Kim,[8] proposed clinical document architecture integration system to support patient referral and reply letters. Many Clinical Document Architecture (CDA) referrals and reply documents have been accumulated for patients since the deployment of the Health Information Exchange System (HIES) in Korea. Clinical data were scattered in many CDA documents and this took too much time for physicians to read. Physicians in Korea spend only limited time per patient as insurances in Korea follow a fee-for-service model. Therefore, physicians were not allowed sufficient time for making medical decisions, and follow-up care service was hindered. To address this, we developed CDA Integration Template (CIT) and CDA Integration System (CIS) for the HIES. The clinical items included in CIT were defined reflecting the Korean Standard for CDA Referral and Reply Letters and requests by physicians.

S. R. Simon, R. Kaushal, P. D. Cleary , C. A. Jenter, L. A. Volk, E. G. Poon, E. J. Orav, H. G. Lo, D. H. Williams, and D. W. Bates,[11] presented correlates of electronic health record adoption in office practices: A statewide survey in which despite emerging evidence that electronic health records (EHRs) can improve the efficiency and quality of medical care, most physicians in office practice in the United States do not currently use an EHR. We sought to measure the correlates of EHR adoption.

III. EXISTING SYSTEM APPROACH

Significantly delays the medical personnel in making decisions the medical personnel in making decisions. A solution that integrates multiple CDA documents into one does not exist yet to the best of our knowledge. There is a practical limitation for individual hospitals to develop and implement a CDA document integration technology. In the existing systems hospitals have to purchase propriety software to generate and integrate CDA documents and bear the cost as before.

Disadvantage:

- 1) Hospitals have to purchase propriety software to generate and integrate CDA documents and bear the cost as before.
- 2) Practical limitation for individual hospitals to develop and implement a CDA document integration technology.
- 3) Integration of multiple CDA documents into one does not exist yet in existing systems.

IV. PROPOSED SYSTEM APPROACH

A solution that integrates multiple CDA documents into one does not exist yet to the best of our knowledge. There is a practical limitation for individual hospitals to develop and implement a 2CDA document integration technology. We proposed following systems:

- A CDA document generation system that generates CDA documents on different developing platforms.

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- CDA document integration system that integrates multiple CDA documents scattered in different hospitals for each doctors and patient.

Advantage:

- 1) Hospitals do not have to purchase propriety software to generate and integrate CDA documents.
- 2) Hospitals do not bear the cost as before.
- 3) Our service is readily applicable to various developer platforms because an Open API is to drive our CDA document generation and integration system.
- 4) CDA document generation and integration system based on cloud server is more useful over existing services for CDA document if the variety of CDA document increases.

V. PROPOSED ARCHITECTURE

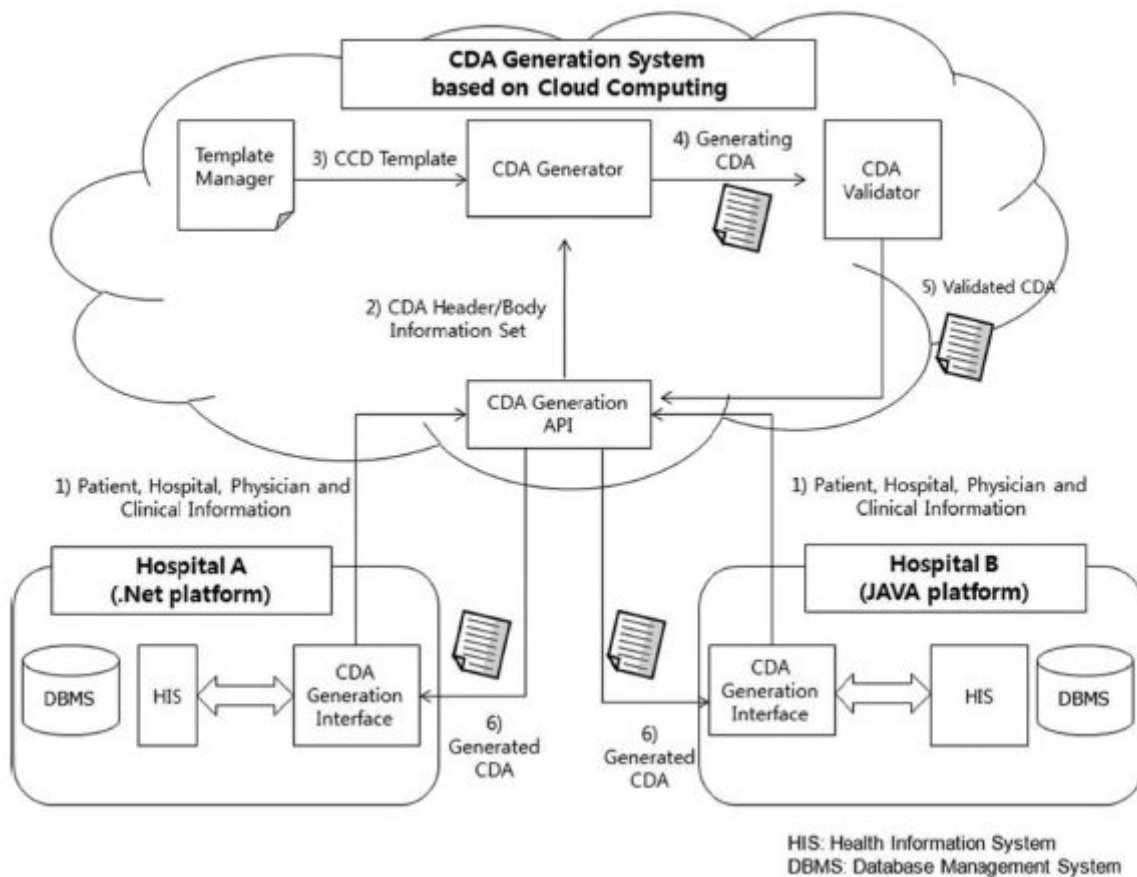


Fig 1.The architecture of CDA generation system

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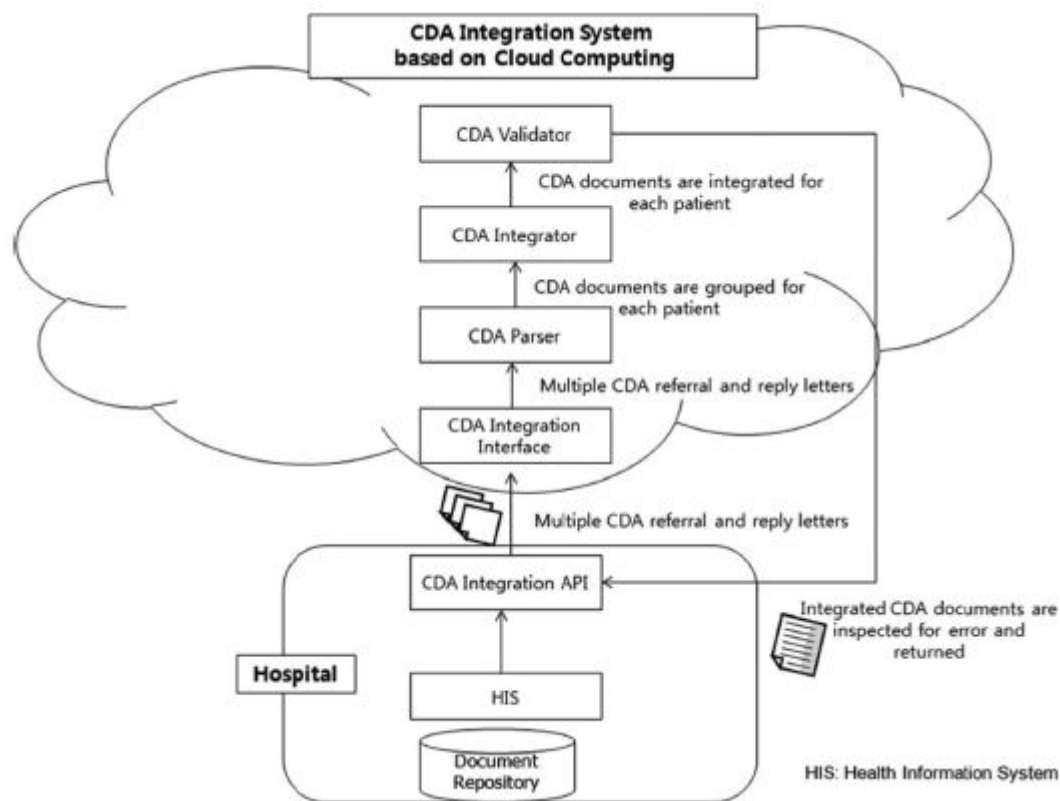


Fig. 2. The architecture of CDA integration system

VI. MODULES

- 1) **User**
User can be patient or doctor who wants' CDA document. Hospitals must have to register in this system and then get advantages of this CDA document generation and integration system.
- 2) **Admin**
Admin should be authorized person who have an authority to check user is authorized person or not.
- 3) **CDA generation system**
With the help of CDA generation system, CDA document of each patient is CDA is generated according to requirement.
- 4) **CDA integration system**
With the help of CDA integration system, all CDA documents of patient are integrated and generate new integrated CDA document.

VII. CONCLUSION

Interoperability between hospitals not only helps ameliorate patient safety and quality of care but also minimize time and resources spent on data format conversion. Interoperability is act toward more important as the number of hospitals participating in HIE increases. As the number of HIE based on CDA documents increases, interoperability is accomplished. We proposed a CDA document generation system that generates CDA documents on different developing platforms and CDA document integration system that integrates multiple CDA documents scattered in



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different hospitals for each patient. The CDA document format a clinical information standard planned to guarantee interoperability between hospitals. CDA document generation and integration system based on cloud server is more helpful over existing services for CDA document if the variety of CDA document increases.

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